

DECISION SUPPORT AT THE LOGISTIC MANAGEMENT STRATEGY

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ABSTRACT: Nowadays logistics more and more often becomes the strategic issue from the point of view the organization aiming at reaching success in lead of its activity. The standard process of strategic logistics planning and management is usually periodical and the chance of cooperation with changes in the environment of the company is missing. The paper presents the process of logistics planning and its integration with the decision support system based on the hierarchic analytic process - AHP (Analytic Hierarchy Process).

Keywords: logistics, logistic management, decision support system

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Logistics is not only determined by the significant functions for the company, but also by the functions which have significant and strategic influence on the company¹. Strategic part of logistics, and its combination with the activity of the organization means the cognitive process of understanding the client extensively, however the connection with management, materials and the flow of information playing the significant part and is determining both satisfying needs and requirements of the client with consideration of products and services².

By the application of logistics to such a method the company has the chance to generate the added value, upsizing its competitive position on the market, and creating the new configurations of products, services and the possibilities, what in turn has the bigger value for the client and is encouraging him to purchases³. That is the reason for creating the more classical approach to logistic planning. And therefore companies are trying also to utilize their logistic possibilities at most and they are integrating them with actions linked to processes of strategic logistic management at the same time⁴.

The process of strategic logistic management consists of such stages⁵:

- specification of action and trends,
- estimations of influence and diligence for determined action and trends,
- priority estimation for these issues,
- planning of the responsibility for these issues.

By the nature strategic logistic management is the active process which means that it is able to shape strategic decisions, even by aggressive method, or to control the trends in the environment⁶.

¹ W. Copacino, D.B. Rosenfield: *Methods of logistics systems analysis*. [w] International Journal of Physical Distribution and Material Management 17 (6), 1987.

² J. Gattorna: *The gower handbook of logistics and distribution management*. Gower Publishing Company. Great Britain, 1990.

³ J.F. Zubrod: *Outsourcing: do more with less*. [w] Traffic and Distribution 7, 1990.

⁴ J.R. Stock, D.M. Lambert: *Strategic logistics management*. Homewood. U.S.A. 1987.

⁵ H.I. Ansoff: *Implanting strategic management*. Finland, 1984.

⁶ J.E. Dutton, E. Ottensmeyer: *Strategic issue management systems: forms, functions and contexts*. [w] Academic Management Review 12(2), 1987.

Often companies utilizing the process of strategic logistic management in its activity, for better handling, they are also using systems of decision support (DSS). The process of the analytic hierarchy (AHP) is one of such systems which is the systematic procedure serving for creating hierarchic structures for each problem⁷. AHP is based on three basic principles:

- decomposition,
- comparative analyses,
- for synthesis of priorities.

AHP is beginning with the decomposition of comprehensive, multicriterial problem to the structure with the hierarchic character, where every level contains a few elements which are reduced to the next set of elements then. Usage of the measuring methodology is the second step in order to determine the priorities among elements on every level in the hierarchy. Third step in AHP is the synthesis of these priorities determined earlier for each elements in order to determine proper priorities in the terminal effect for alternative decisions. AHP can be used to support of executive decisions and for transferring recommended actions⁸.

The first step in the process of strategic logistic management is fixed monitoring of the external environment, its changes linked to the reaction for the company, and impact of this environment on the company activity⁹. The AHP method is used for determining outline of identification and the analysis of showing up trends and problems. The basic idea is such designing of the AHP hierarchy, which will be serving to the estimation of influence showing up trends and problems in purposes intended on the chance to reach of logistic functions. Since support of the company is the part of logistic functions in reaching overall purposes, as tasks are also taken into consideration from the level of organization in AHP. Regarding to it, the chances to analyze how influences on strategic issues are formed in time, there are three analytical periods, i.e. hierarchies: short-term (1 year), medium-term (1-3 years) and long-term (over 3 years). Using this process at such assumptions there are necessary some suggested classifications. They refer mainly to strong points, which should be internal issues having positive influence on the company, weak points, i.e. internal issues about negative influence on the company, and chances and threats - external issues about in accordance positive and negative influence on the company¹⁰.

The influence and diligence force estimation is the other step in the process of strategic logistic management for each issues, what is necessary for assigning priorities to them as well as necessary responses specifications to these issues¹¹. There are alternative kinds of actions:

- immediate action in reply to urgent issues and about robust influence,
- the answer postponed for urgent issues and about robust influence,
- action is missing with respect to urgent issues and about small influence,
- periodic monitoring of other kinds of issues.

In the approach based on AHP priorities are determined for all elements in determined hierarchies, and influences of determined issues are analyzed for logistic functions with usage of specially created in this purpose seven-steps scale. The chance to reassess influence of the given issue for every logistic task is the effect of AHP analyses, as well as for logistic functions as whole in the short, average and long period. Effects of analyses are forming the decision base about the kind of the required response to every strategic issue and the optimal time for introducing it.

The third step in the process of strategic logistic management is planning of required responses to strategic issues. Responses to determined issues and strategic problems are planned in the AHP approach in the occurring way:

- the issue requiring answers is analyzed and partitioned into parts,

⁷ T.L. Saaty: *Priority setting in complex problems*. [w] IEEE Transport Engineering Management 31(3), 1983.

⁸ P. Sierila: *Corporate planning, strategies and critical factors in forest industries*. Finland, 1991.

⁹ H.I. Ansoff: *Implanting strategic management*. Finland, 1984.

¹⁰ H.I. Ansoff: *Implanting strategic management*. Finland, 1984.

¹¹ H.I. Ansoff: *Implanting strategic management*. Finland, 1984.

- alternative trends of action are determined in reply to given issue,
- the hierarchic AHP structure based on earlier elements is created,
- priorities are delivered for each elements in hierarchy,
- synthesis of priorities in order to take the decision about the most effective answer,
- the effect is reinspected further away when using more detailed analyses.

The system of the decision support based on AHP is peculiarly useful in companies which have complex distributions channels and their logistic system is one of the main success factors.

In order to restate discussed issues more visually and practicality it is possible to use the example constructed theoretically of the fictitious company X¹². The AHP structure used for identification and analyzing strategic issues began by defining the level of the company and logistic purposes. For the exemplifying company X the purposes included in issues of the strategic management process are: raising the present market share by 20% within the 5 next years, reaching the competitive leader's positions provided to clients in the industry, which this company is operating, in under consideration of the quality of the product and services, and raising profitability by about 25% within the 5 next years. Since help in achievement of determined purposes is the part of logistic functions for company, is important to strictly link logistic purposes with company purposes. For example logistic purposes are: raising reliability of the logistic chain, raising logistics flexibility, minimization of logistic expenses required by the client on the services level, and improvement in the quality of logistic operations (e.g. missing damage, etc.).

In the hierarchy the logistic tasks are putting on the second level and linked to companies tasks from the first level. Usually, alternative decisions are putting on the lowest point in the AHP hierarchy. Also estimations are putting in the hierarchy on the lowest point. Estimations are quality descriptions of possible influence, which strategic issues have for logistic tasks. Through using estimations for income assessing, is possible to analyze every issue as fast as soon it showed up, by simple assigning of the estimation for the issue connected with logistic task. Estimations used for the hierarchy are based on the environment factors classification. They are formed on the seven-steps scale principle as follows¹³:

- Chance/strength: the profitable event or the trend which the positive effect is exerting on organization performance;
- Positive impulse: to convert the profitable event or the trend which is able or perhaps might be converted into the chance or the strong point;
- Positive character: the event or the trend which is making the forecast of the positive impulse, the chance or the strong point possible;
- Neutral: the neutral event or the trend which potential has for producing the positive or negative effect for the activity of the organization;
- Negative character: the event or the trend which is making the forecast of the problem, the threat or the weak point possible;
- Problem: the event or the trend which requires the suitable reaction in order to prevent its transformation to the threat or the weak point;
- Threat/weak point: the unfavorable event or the trend which is negatively influencing on organization.

The same hierarchy is used for the analysis of strategic issues in the short, average and long temporary horizon. Despite it, such approach is flexible in the meaning that if it is necessary, there is a possibility to apply of various hierarchic structures for various temporary horizons.

With the next step in AHP, assisting issues of the strategic logistic management process, is delivering priorities for every element in hierarchy. Priorities for elements are determined by own

¹² J. Korpela, M. Tuominen: *A decision support system for strategic issues management of logistics*. [w] International Journal of Production Economics 46-47, 1996.

¹³ P. de Vasconcellos Filho: *Environmental analysis for strategic planning*. [w] Managerial Planning 33(2), 1985.

value method¹⁴. Company and logistics priorities are able for changing in time. Using three various hierarchies for priorities because of the temporary factor and changes for tasks and estimations: short-termed, medium-term and long-term, basic structures are the same for every hierarchy, but priorities of elements are delivering separately for every hierarchy, taking under remark also the change in priorities for every temporary period. The analysis is making strategic issues possible for various temporary periods term, influence is appearing for determined issues and they are developing in the time.

Tasks of the company are compared first when using such a hierarchy in pairs because of the purpose which it is comparatively significant for tasks on every level at company. Than logistic tasks are compared to pairs because of importance of company tasks, what is comparatively important for every logistic task because of every company task. In classic weigh and point approaches, estimations have suitable ordinal numbers assigned, so how for +2 example for the positive impulse and +3 for the chance¹⁵.

Thanks to it, with effect of constructing the hierarchy in such a way determining the tasks important for the company, the count are contributing of every logistic task to reaching the company tasks, and reassessing the preference of estimations because of every logistic task. So partitioning the hierarchy because of the time to turn out perhaps that it is the short-termed task most important for the X company raising profitability, the medium-termed is raising of the market share, and is long-term obtaining of the competitive leader's position. These priorities are able to be subject to changes in the time. However the main priority is invariable - improvement in the quality of the logistic chain what is the most important task in every accepted temporary period.

Immediate beginning is revealed by the analyses necessary for its end to planning actions which will be taken up in this analysis on the above-mentioned basis in reply to problems. Most effective referring answers are generated thanks to usage of the AHP procedure every showing up in the analysis of issues referring to strategic logistic management. Such a form of the decision support system is the very flexible tool for defining the most profitable actions with respect to various problems.

Strategic logistic management which is the systematic and continuous process serving early identification and the early reply was restated in the product for every problems and events showing up in the internal and external environment of the company. Decisions are taken up in the process of strategic logistic management as a rule on the basis of quality verdicts and inadequate information. And therefore the usage of the decision support system(DSS) is more often the very profitable solution for strategic management of logistic actions. DSS leaned on principles of the hierarchic analytic process (AHP) was restated here, in which complex, multicriterial elements have on every level of this hierarchy the problem reduced to the hierarchic structure allocated suitable priority value, but the ones of time they are synthesize and they are defining as alternative decisions. Such a form of the decision support system is rising through the systematic, flexible and continuous process of strategic management. DSS is utilized for estimating the overall impact of determined strategic factors on every key task determined on the logistic level and the company first, and then collected to the specification of most effective actions in reply to strategic issues about biggest positive or negative influence on the company. The effective connection with logistic management with strategic management is possible thanks to it, what makes possible more effective comprehensive managing of processes linked to the activities of the company.

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